

WHAT IS CLAIMED IS:

1. An ink jet head comprising:

a substrate having a plurality of energy generating
5 elements for generating energy utilized to discharge an ink
provided thereon, said substrate having a recessed portion;
and

a wall member joined to said substrate, said wall
member having a plurality of flow passage walls which
10 partially define a plurality of flow passages, the energy
generated by said energy generating elements acting through
said flow passages so as to act on the ink to discharge the
ink, said flow passages being fully-defined when said
substrate is joined to said wall member,

15 wherein said recessed portion of said substrate is
provided between adjoining said energy generating elements,
said recessed portion having a bottom surface located at a
position which is lower than a position of a heat acting
surface of said substrate along which heat is transmitted
20 to the ink, said flow passage walls of said wall member
abutting said substrate at said bottom surface.

2. The ink jet head according to claim 1, wherein said
ink jet head is of a full line type in which a plurality of
discharge ports for discharging the ink are disposed over
25 an entire recordable area of a recording medium.

3. The ink jet head according to one of claims 1 or 2,
said energy generating element comprising an electro-
thermal transducer which causes the heat energy to act on
the ink to generate a bubble so that the ink is discharged
5 as a result of growth of the bubble.

4. The ink jet head according to claim 1, wherein a
raised convex pattern of material is provided on a surface
of said substrate at an end portion thereof in a direction
in which said plurality of energy generating elements are
10 arranged, and wherein said wall member has a recessed
portion corresponding to said convex pattern.

5. The ink jet head according to claim 4, wherein said
recessed portion of said wall member is provided within a
dummy nozzle portion.

15 6. The ink jet head according to claim 4, wherein said
convex pattern is made of at least one of an epoxy and a
silicone type photosensitive material.

7. A method of manufacturing an ink jet head having a
substrate having a plurality of energy generating elements
for generating energy utilized to discharge ink provided
thereon, said substrate having a recessed portion, and a
wall member joined to said substrate, said wall member
having a plurality of flow passage walls which partially
define a plurality of flow passages, the energy generated
25 by said energy generating elements acting through said flow

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passages so as to act on the ink to discharge the ink, said flow passages being fully-defined when said substrate is joined to said wall member, said method comprising the steps of:

- 5 providing a plurality of recessed portions in said substrate;

 fitting said recessed portions to said flow passage walls of said wall member by applying a force to said wall member along a direction in which said plurality of energy
10 generating elements are arranged, thereby aligning said flow passages with said energy generating elements.

8. The method of manufacturing an ink jet head according to claim 7, further comprising the steps of:

- providing a raised convex pattern of material on a
15 surface of said substrate at an end portion thereof in a direction in which said plurality of energy generating elements are arranged, and wherein said wall member has a recessed portion corresponding to said convex pattern.

9. The method of manufacturing an ink jet head according
20 to claim 8, wherein said recessed portion of said wall member is provided within a dummy nozzle portion.

10. The method of manufacturing an ink jet head according to claim 7, wherein said convex pattern is made at least one of an epoxy and a silicone type photosensitive
25 material.

11. A method of manufacturing an ink jet head having a substrate having a plurality of energy generating elements for generating energy utilized for discharging an ink provided thereon, said substrate having a recessed portion, and a wall member joined to said substrate and having a plurality of flow passage walls which partially define a plurality of flow passages, the energy generated by said energy generating elements acting through said flow passages so as to act on the ink to discharge the ink, said
10 flow passages being fully-defined when said substrate is joined to said wall member, said method comprising the steps of:

providing a plurality of recessed portions in said substrate;

15 fitting said recessed portions to said flow passage walls of said wall member by vibrating said substrate so that a force having at least a component acting in a direction in which said plurality of energy generating elements are arranged is applied to said wall member,
20 thereby aligning said flow passages with said energy generating elements.

12. The method of manufacturing an ink jet head according to claim 11, further comprising the steps of:

providing a raised convex pattern of material on a
25 surface of said substrate at an end portion thereof in a

direction in which said plurality of energy generating elements are arranged, and wherein said wall member has a recessed portion corresponding to said convex pattern.

13. The method of manufacturing an ink jet head according
5 to claim 12, wherein said recessed portion of said wall member is provided within a dummy nozzle portion.

14. The method of manufacturing an ink jet head according
to claim 11, wherein said convex pattern is made at least
one of an epoxy and a silicone type photosensitive
10 material.

15. The method of manufacturing an ink jet head according
to claim 11, wherein said substrate is vibrated by
vibrations having an amplitude which is smaller than a
width of said recessed portion formed in said substrate.

16. An apparatus for manufacturing an ink jet head having
15 a substrate having a plurality of energy generating elements for generating energy utilized to discharge an ink provided thereon, said substrate having a recessed portion, and a wall member joined to said substrate and having a
20 plurality of flow passage walls which partially define a plurality of flow passages, the energy generated by said energy generating elements acting through said flow passages so as to act on the ink to discharge the ink, said recessed portion is fitted to each of said flow passage
25 walls formed in said substrate so that said flow passages

are defined when said flow passage walls engage said recessed portions, said apparatus comprising:

retaining means for retaining said substrate in which said recessed portions are provided;

5 placing means for placing said wall member on said substrate retained by said retaining means in such a manner that said recessed portions oppose said flow passage walls;

pressing means for pressing said wall member with a force having at least a force component in a direction in
10 which said plurality of energy generating elements are arranged, said wall member having been placed by said placing means in a state wherein said wall member is stacked on said substrate; and

vibration means for vibrating said substrate so that
15 the force component acts in the direction.

17. The apparatus for manufacturing an ink jet head according to claim 16, wherein said substrate is vibrated by vibrations having an amplitude which is smaller than a width of said recessed portion formed in said substrate.

20 18. An ink jet apparatus comprising:

an ink jet head having a substrate having a plurality of energy generating elements for generating energy utilized to discharge an ink provided thereon, said substrate having a recessed portion, and a wall member
25 joined to said substrate, said wall member having a

plurality of flow passage walls which partially define a plurality of flow passages, the energy generated by said energy generating elements acting through said flow passages so as to act on the ink to discharge the ink, said
5 flow passages being defined when said substrate engages said wall member; and

driving signal generation means for generating signals for driving said energy generating elements of said ink jet head,

10 wherein said recessed portion has a bottom surface located at a position which is lower than a position of a heat acting surface of said substrate along which heat is transmitted to the ink, said flow passage walls of said wall member abutting said substrate at said bottom
15 surfaces.